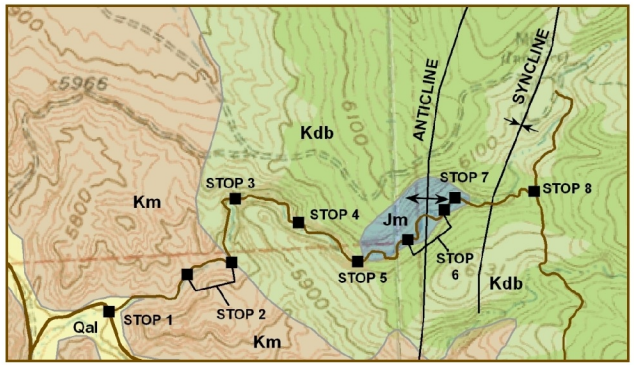
HOW TO USE THIS TRAIL GUIDE

The trail guide begins at the trail head at Peach Valley and Chukar Roads and ends at the intersection of the Eagle Valley Trail with Sheep Drive Trail. There are eight stops along the trail and each are illustrated by a photo and designated on the trail map (inside the brochure). As you hike the trail, look at the photo illustration and read about the geology of the stop. Two stops (Stop 2 and Stop 6) describe a section of trail between the two markers on the map. The Eagle Valley Trail is at times deeply incised and at times opens to broad vistas. Take your time, read the descriptions, and enjoy the journey.

GEOLOGIC MAP OF THE EAGLE VALLEY TRAIL



Source: USGS Professional Paper 1699, Kellogg, 2004.

Qal — Alluvium: recent stream deposits present in drainages; silt, sand, gravel, and boulders eroded from the surrounding area and transported down stream during flood events.

Km — Mancos Shale: primarily gray shale, very soft and easily eroded into rounded hills. Deposited in a shallow sea; contains fossil shells and shark teeth. Late Cretaceous.

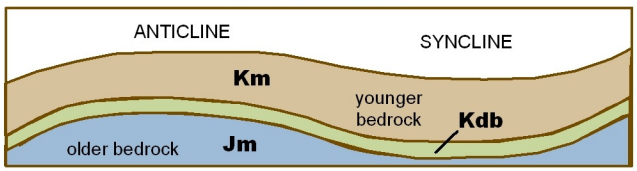
Kdb — Dakota-Burro Canyon Formations: Two formations commonly grouped together due to similar lithology of tan sandstone interbedded with dark gray to black shale. Deposited in sluggish streams and swamps; the shale in the Dakota Fm. locally grades to a low grade coal. Late Cretaceous.

Jm — Morrison Formation: A colorful sequence of maroon, green, tan, and purple interbedded sandstone, limestone, and shale; deposited along meandering rivers and lakes; regionally contains dinosaur fossils. Upper Jurassic.

Anticline: an up-warping of bedrock in which the rock in the center of the fold is oldest and the bedrock units on each side slope away from the center. See illustration, below.

Syncline: a down-warping of bedrock in which the rock in the center of the fold is youngest and the bedrock units on each side slope toward the center. See illustration, below.

PROFILE OF ANTICLINE AND SYNCLINE
(NOT TO SCALE)



A PERIOD OF MOUNTAIN BUILDING

The landscape of the Gunnison Gorge National Conservation Area (GGNCA) is a reflection of an episode of mountain building during the Late Cretaceous and Early Tertiary periods called the Laramide Orogeny. It was during this time that continental-scale forces, driven by plate tectonics (movement of large plates of the earth's crust), pushed and folded rock into the Rocky Mountains. Later forces, including regional uplift, volcanism, erosion, and glaciation, futher defined the landscape of Colorado as we know it today.

The stunning scenery of the Gunnison Gorge National Conservation Area includes the Gunnison Uplift, a small component of the Laramide Orogeny. Within the GGNCA, the Ute Indian Fault is exposed as a thrust fault, bringing ancient Precambrian "basement" rock up more than 1,000 feet to the level of younger sedimentary rock. The Ute Indian Fault, along with other Laramide faults in the area, created the present landscape in which the gently eastward dipping sediments of the Uncompahgre Valley are dramatically uplifted along the Gunnison Uplift on the east side of the valley. Where bedrock units are not broken by faulting, they are frequently folded. Evidence of broken and folded bedrock are present across the Gunnison Gorge National Conservation Area and contribute to the unique landscape. The Eagle Valley Trail crosses an area of folded bedrock and brings the hiker to a small but representative reflection of the power of the mountain building processes of the Laramide Orogeny.

REFERENCES

Want to learn more about the geology of the Gunnison Gorge National Conservation Area? The following publications are recommended and can be obtained on-line or at the Bureau of Land Mangement office in Montrose, Colorado.

The Geologic Story of Gunnison Gorge National Conservation Area, Colorado; Karl S. Kellogg; USGS Professional Paper 1699, 2004. Available at the Public Lands office in Montrose, Colorado.

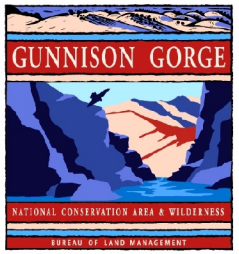
Geologic Map of the Olathe Quadrangle, Montrose County, Colorado; Colorado Geological Survey Open File Report 07-01, Morgan et al, 2007. Available on-line from the Colorado Geological Survey: http://geosurvey.state.co.us

Compiled by Nancy Lamm, P.G.

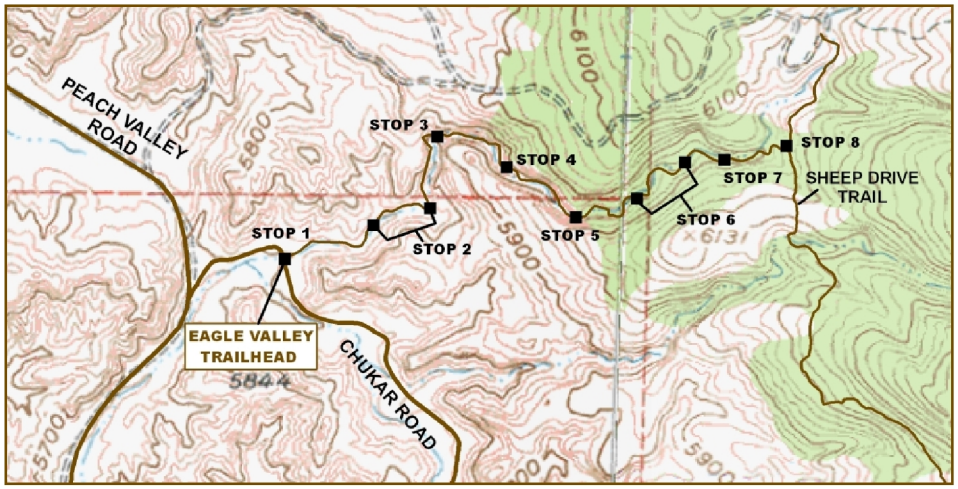
EAGLE VALLEY TRAIL

GUNNISON GORGE NATIONAL CONSERVATION AREA AND WILDERNESS

A 1.25 mile (one way) hike, the Eagle Valley Trail takes you across badlands, into slot canyons, up along dipping bedrock leading into a small natural amphitheater, and through the center of a geologic anticline, to emerge at a vista of the Uncompahgre Valley. The trail is moderate and includes short stretches of slickrock climbing. Water and hiking boots are recommended. From the summit, the Eagle Valley Trail connects with a system of trails within the Gunnison Gorge National Conservation Area, allowing you to hike and explore your public lands.



MAP OF EAGLE VALLEY TRAIL



STOP 1: EAGLE VALLEY TRAIL HEAD AND THE MANCOS SHALE

Standing at the Eagle Valley trail head at Peach Valley, the rounded hills around you are sediments deposited in an ancient shallow inland sea during the Cretaceous period, around 75 million years ago. The seafloor muds became the Mancos Shale formation. Marine fossils, including clams, ammonites (similar to our modern nautilus), and shark teeth can be found in the Mancos Shale. The rounded hills are typical of the fine grained Mancos Shale as the formation is nonresistant and easily eroded, thus earning the local name of the "adobe badlands". The Mancos Shale is designated as "Km" on the geologic map on the reverse side of the trail guide.

STOP 2: DAKOTA SANDSTONE AND BURRO CANYON FORMATION SLOT CANYONS

As you hike along the section of trail designated as Stop 2, you cross the contact of the Mancos Shale with the underlying Dakota-Burro Canyon Formations. Notice the abrupt shift from rounded hills to a steep, narrow slot canyon and the presence of angular sandstone rock scattered along the canyon walls and floor. The Dakota-Burro Canyon is resistant to erosion, thus forming the cliffs and canyons of Eagle Valley. Notice, too, the steep angle of the bedrock exposed on the trail. The bedrock is dipping (sloping) to the west and, as you hike, you are ascending the west side of an anticline (an up-warping of the rocks). The knobby surfaces of the sandstone bedrock you are walking on are ripple marks, indicating deposition in shallow water with consistant wave action, now preserved in stone. The Dakota-Burro Canyon Formations are designated as "Kdb" on the geologic map on the reverse side of the trail guide. The two formations are generally grouped together on geologic maps due to a similar appearance.

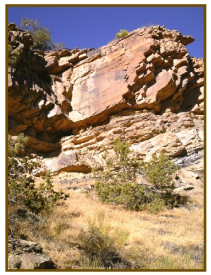
STOP 3: COAL IN THE DAKOTA SANDSTONE

The black seam visible on the north side of the canyon is coal. The presence of the small mine adit (entrance) is an indication that coal was once mined at the Gunnison Gorge National Conservation Area. The coal is a product of a coastal swamp present during Late Cretaceous time, approximately 100 million years ago. Over time, the organic rich sediments were covered by younger sediments and were compressed into coal. Note how the coal seam splits into two seams just left of the mine adit. Coal resources of the Dakota Sandstone in this area tend to be shaly and of poor quality but improve to the west in the vicinity of Nucla, Colorado where Dakota Sandstone coal is mined commercially. The coal seam and surrounding rock dip down to the west along the west flank of the anticline. Above the mine adit, the Dakota-Burro Canyon Formations form angular ledges, overhangs, and cliffs.

STOP 4: ROCKFALL IN THE CANYON

The large boulders on either side of the trail are the result of rockfall within the steep canyon. Rockfall, a continuous process in canyons composed of fractured rock, is a result of freeze-thaw action and gravity. Water from precipitation or snowmelt seeps into cracks and freezes. As the water turns to ice, it expands and, acting as a wedge, breaks the fracture open a bit further. When the ice melts, the water seeps deeper into the crack and the process continues. Rockfall causes a continual widening of the canyon. Eventually the rocks slide or tumble into the drainage and are transported downstream during flood events, breaking into smaller and smaller fragments in the continual process of erosion.

STOP 5: EAGLE NESTS IN EAGLE VALLEY



As the trail makes a bend and crosses an area of sloping sandstone bedrock, look up to the southwest at the massive sandstone cliff exposure. Three eagle nests are tucked into the alcoves and ledges formed by the resistant Dakota-Burro Canyon Formations. The hill slope below the nests is mantled with rocks fallen from the shear cliff face above. The resistant sandstone bedrock is fractured and broken from deformation resulting from folding of the anticline. Geologists can carefully measure the angles and patterns of fractures in bedrock and determine the direction of the mountain building forces that shaped our world in the past. The anticline and syncline that the Eagle Valley Trail pass through are due to east-west compression during the mountain building process of the Laramide Orogeny.

STOP 6: EXPOSURES OF THE MORRISON FORMATION

As you walk along the section of trail noted as Stop 6, notice how the bedrock exposed along the canyon walls shifts to a colorful array of maroon, pale green, purple, and tan rock and soil as the Morrison Formation is exposed in the core of the anticline. The canyon is wider here, as the finer grained sediments of the Morrison Formation are more easily eroded. The Morrison is Jurassic in age, about 150 million years old. Folding (up-warping) of the anticline has brought the older Morrison Formation up to the same level along the trail as the younger Dakota-Burro Canyon Formations, outcropping along the Eagle Valley Trail to the east and west. The Morrison Formation is designated as "Jm" on the geologic map on the reverse side of the trail guide.

STOP 7: EASTWARD DIPPING DAKOTA-BURRO CANYON FORMATIONS

Look at the sandstone ledges on the north side of the drainage and note how the bedrock is now tilting to the east (up drainage). At Stop 7, the Dakota-Burro Canyon Formations are exposed on either side of the trail along the east flank of the anticline. This east-dipping eastern side of the anticline becomes the western side of a subtle syncline (down-warping of strata). See the geologic map on the reverse side of the trail guide for the location of the axis of the syncline between Stops 7 and 8. The syncline here is more difficult to observe than the anticline exposed in the canyon walls to the west. Careful measurements of the angle of dip of bedrock units provide geologists insight into bedrock structure not easily observed.

STOP 8: INTERSECTION OF EAGLE VALLEY TRAIL WITH SHEEP DRIVE TRAIL

You are standing at the intersection of the Eagle Valley Trail with the Sheep Drive Trail with a stunning view of the Uncompahgre Valley. In walking from Stop 7 to Stop 8, you crossed the axis of the syncline and bedrock units are now dipping to the west. Far off in the distance is the Uncompahgre Plateau, capped by the resistant Dakota-Burro Canyon Formations. The Uncompahgre Plateau rises as a resistant upland, cut by deeply incised streams in canyons similar to Eagle Valley. The easily eroded Mancos Shale extends across the Uncompahgre Valley and is overlain by younger alluvial deposits of the Uncompahgre River.